

away from any icon. If every icon responded specially to finger taps, the main function of tapping to simulate a mouse click would become too inconvenient to use. A visual convention may be used to indicate which icons represent tap-sensitive regions; in the example of **FIG. 4**, dashed lines **426** and **428** are used to indicate these regions.

[0050] Icon group **414** includes the traditional set of status icons that appear on modern portable computers, such as numeric keypad lock, caps lock, scroll lock, hard disk activity, battery life, and system power. By locating these system icons on the touch screen display, the system designer eliminates the need for the special dedicated LED or LCD status displays that are typically used in prior art computers.

[0051] In some prior art portable computers, the dedicated system status displays are situated so that they are visible even when the cover of the computer is closed over the main display. The touch screen of the present invention could similarly be situated so that all or part of the screen image is visible when the cover is closed, for example, by causing the touch screen to protrude from under the cover or by cutting a notch in the cover over the location of the touch screen. This arrangement would allow the user to monitor battery recharging and other quiescent activities of the computer system while the computer is not in use.

[0052] Icon **416** is an e-mail notification status icon; icon **416** may, for example, change to a new shape or animated image to indicate that e-mail has arrived. Icon **418** similarly notifies the user of imminent appointments. These icons suggest a natural action that could be taken when the user taps on the icons, such as opening the associated e-mail reading or appointment scheduling software. Because these icons are located nearer the center of the touch sensing area and could easily be tapped by accident, icons **416** and **418** may be made sensitive to finger taps only when they have been activated by some separate means such as pressing a special function key on keyboard **104**.

[0053] Icons **420** and **422** represent commands to select pop-up applications on the touch screen. Icon **420** selects an application launcher. Icon **422** selects a calculator or numeric keypad. Like icons **416** and **418**, icons **420** and **422** may be made sensitive to finger taps only when the touch screen is in the activated state.

[0054] Icon **424** represents the volume control for the sound system and speakers of the computer. Icon **424** includes a visual slider and "thumb." The position of the thumb on the slider reflects the current volume setting. When the touch screen is in the activated state, finger motions within the volume control region can move the thumb to a different location on the slider to adjust the volume level. When the touch screen is not in the activated state, icon **424** is a visual display only and has no special interpretation when touched. Similar slider controls may be provided to adjust other system parameters such as the sound balance among several sound sources, the brightness and contrast of the main screen or touch screen, or the power management strategy.

[0055] The icons depicted in **FIG. 4** are illustrative of the types of icons that can be provided on the iconic mode screen. **FIG. 4** does not necessarily represent the ideal selection or placement of icons. Human-factors testing may

be used to decide on the number, types, and placement of icons in the default iconic screen. Also, it may be advantageous to allow the user to select which icons are present and to rearrange the icons, possibly using a software control panel. Because the number of candidate icons likely exceeds available space, it may be desirable to provide multiple iconic screen layouts selectable by some means such as in the software control panel or by tapping on an icon on the touch screen.

[0056] It will be obvious to one skilled in the art that many other images, logos, status indicators, command buttons, controls, and other types of icons can share the touch screen display in the iconic usage mode. These icons can be purely display indicators, or they can indicate control regions that respond specially to finger motions and/or finger taps, either at all times or only when the touch screen has been activated in a special way. Some icons may be built-in by the system designer, such as the system status icons or the logo of the computer manufacturer. Other icons may be created and maintained by application software running on the computer, such as an e-mail notification icon.

[0057] The activated state of the touch screen may be indicated by a visual convention. **FIG. 5** illustrates the touch screen image of **FIG. 4** modified to indicate the activated state of the touch screen using a dashed line around each icon that is touch-sensitive in the activated state. In image **500**, dashed lines **516**, **518**, **520**, and **522** have surrounded certain icons to indicate that finger taps in the regions near these icons will be interpreted as special commands to the icons. Similarly, dashed outline **524** indicates that finger motions in the volume control region will adjust the setting of the control. Outline **512** for the time and date icon has become dashed to indicate that a tap on this icon will activate a special function such as setting the time or accessing a world clock. Outline **514** for the system status icons remains solid to indicate that, in the example of **FIG. 5**, these icons have no special tapping functions in the activated state. Dashed lines **526** and **528** remain to indicate that the corner tap regions continue to have their special tap interpretations when the touch screen is in the activated state. Many other visual conventions would serve equally well to indicate touch-sensitive icons, such as solid or colored lines, colored or inverted backgrounds, changes in brightness or coloration of the activated icons, changes in shape or animation of the activated icons, or other well-known conventions for highlighting a portion of an image.

[0058] The example of **FIGS. 4 and 5** illustrates the same set of icons in the activated and unactivated state. However, activation of the touch screen could also create additional icons that are not present, for example to reduce clutter, when the touch screen is not in the activated state. Existing icons could also be removed or rearranged, although to avoid confusion, this could be done only to replace icons not useful in the activated state, such as icon **414** of **FIG. 4**, with other icons that are most useful when activated, such as icons similar to icons **420** and **422**.

[0059] There are many possible alternative mechanisms for the user to signal the activation of touch screen icons. In the simplest case, the icons are either always inactive or always active for tapping or motion commands. The corner tapping and scrolling region icons **302**, **304**, and **306** of **FIGS. 3 and 402**, **404**, **406**, and **410** of **FIG. 4** are examples